Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method for creating a dental model from <u>image parameters obtained from</u> a series of <u>overlapping</u> images of an intra-oral object, said method comprising the steps of:

(a) capturing the series of <u>overlapping</u> images of the intra-oral object and a 3-dimensional control target from a plurality of ~~non-orthogonal~~ <u>different</u> capture positions <u>via an imaging process utilizing a sensor</u>, where the object includes common surface features, wherein said control target is <u>comprised of rigid lengths of material</u> ~~in close proximity to the object, and~~ arranged <u>in three dimensions</u> with respect to the object to provide control features <u>comprising vertices between the rigid lengths</u>;

(b) measuring the control features from the images of the control target and the object;

(c) analytically generating a 3-dimensional model of the object by photogrammetrically adjusting the image parameters <u>according to a multiray stereo intersection process by</u> using the measurements of the control features <u>to compute object-space coordinates of any object point which is imaged in the overlapping images from varying capture orientations</u>, thereby providing a photogrammetrically aligned 3-dimensional model of the object <u>that has been processed with an analytical representation of a physical model which represents the imaging process of the sensor that captured the images</u> ~~while~~ <u>thereby</u> reducing image errors due to ~~distortion and~~ <u>the imaging process including</u> the variable orientations of the capture positions; and

(d) adjusting the photogrammetrically aligned 3-dimensional model of the object by aligning the common features of the model to like features in the image of the object, thereby producing an aligned dental model from the series of images.

2.   (original) The method as claimed in claim 1 wherein step (b) further includes the step of measuring the common features from the series of images of the object.

3.   (currently amended) The method as claimed in claim 1 wherein step (c) comprises the steps of:
    performing a photogrammetric adjustment; and
    refining the photogrammetric adjustment by photogrammetrically projecting a 3-dimensional model of the target <u>onto one of the overlapping images of the object</u>, determining misalignment of the control features and correcting the misalignment, thereby producing the photogrammetrically aligned 3-dimensional model of the object.

4.   (currently amended) The method as claimed in claim 1 wherein step (d) comprises the steps of:
    determining misalignment of the common features in the photogrammetrically aligned 3-dimensional model relative to the images of the object by photogrammetrically projecting the model onto <u>one of the overlapping</u> ~~an~~ image<u>s</u> of the object; and
    applying a 3-dimensional morphing algorithm to correct for the misalignment.

5.   (original) The method as claimed in claim 1 further comprising the step of using the aligned dental model to generate a dental restorative piece for the intra-oral object.

6.   (previously presented) The method as claimed in claim 1 further comprising the steps of providing a database of generic 3-dimensional models and utilizing a selected one of the generic models in step (d) in the alignment of the common features of the photogrammetrically aligned 3-dimensional model to like features on the image of the object.

7.   (original) The method as claimed in claim 1 wherein the intra-oral object is one or more teeth.

8.   (original) The method as claimed in claim 7 wherein the control target is positioned around said one or more teeth.

9.   (currently amended) A system for creating a dental model from a series of <u>overlapping</u> images of an intra-oral object, said system comprising:

a camera for capturing a series of <u>overlapping</u> images of an intra-oral object and a 3-dimensional control target from a plurality of ~~non-orthogonal~~ <u>different</u> capture positions <u>via an imaging process utilizing a sensor</u>, where the object includes common surface features, wherein said control target is <u>comprised of rigid lengths of material</u> ~~in close proximity to the object, and~~ arranged <u>in three dimensions</u> with respect to the object to provide control features <u>comprising vertices between the rigid lengths</u>;

photogrammetric means for measuring the control features from the images of the control target and the object;

a digital processor including instructions for (a) analytically generating a 3-dimensional model of the object by photogrammetrically aligning the measurements of the control features <u>according to a multiray stereo intersection process to compute object-space coordinates of any object point which is imaged in the overlapping images from varying capture orientations</u>, thereby providing a photogrammetrically aligned 3-dimensional model of the object <u>that has been processed with an analytical representation of a physical model which represents the imaging process of the sensor that captured the images</u> ~~while~~ <u>thereby</u> reducing image errors due to <u>the imaging process including</u> the variable orientations of the capture positions; and (b) adjusting the photogrammetrically aligned 3-dimensional model of the object by aligning the common features of the model to like features in the images of the object, thereby producing an aligned dental model from the series of images.

10.   (original) The system as claimed in claim 9 wherein said photogrammetric means further measures the common features from the series of images of the object.

11.   (currently amended) The system as claimed in claim 9 wherein said digital processor further includes instructions for performing a photogrammetric adjustment and refining the photogrammetric adjustment by photogrammetrically projecting a 3-dimensional model of the image onto one of the overlapping images of the object, determining misalignment of the control features and correcting the misalignment, thereby producing the photogrammetrically aligned 3-dimensional model of the object.

12.   (currently amended) The system as claimed in claim 9 wherein said digital processor further includes instructions for determining misalignment of the common features in the photogrammetrically aligned 3-dimensional model relative to the images of the object by photogrammetrically projecting the model onto an one of the overlapping images of the object and applying a 3-dimensional morphing algorithm to correct for the misalignment.

13.   (original) The system as claimed in claim 9 further comprising fabrication apparatus using the aligned dental model to generate a dental restorative piece for the intra-oral object.

14.   (original) The system as claimed in claim 9 wherein the intra-oral object is one or more teeth.

15.   (original) The system as claimed in claim 14 wherein the control target is positioned around said one or more teeth.

16.   (currently amended) A method for creating a dental model from a series of overlapping images of one or more teeth, said method comprising the steps of:
(a) capturing a series of overlapping images of said one or more teeth and a 3-dimensional control target from a plurality of non-orthogonal different capture positions via an imaging process utilizing a sensor, where said one or more teeth include cusp and valley surface features describing their natural topographic surfaces and a rigid control target comprised of rigid lengths of material arranged in three dimensions with respect to said one or more teeth and

resting on said one or more teeth so as to provide control features <u>comprising</u> <u>vertices between the rigid lengths</u>;

(b) measuring the control features from the images of the control target and said one or more teeth;

(c) analytically generating a 3-dimensional model of said one or more teeth by photogrammetrically aligning the measurements of the control features <u>according to a multiray stereo intersection process to compute object-space coordinates of any object point which is imaged in the overlapping images from varying capture orientations</u>, thereby providing a photogrammetrically aligned 3-dimensional model of said one or more teeth <u>that has been processed with an analytical representation of a physical model which represents the imaging process of the sensor that captured the images</u> ~~while~~ <u>thereby</u> reducing image errors due to <u>the imaging process including</u> the variable orientations of the capture positions; and

(d) adjusting the photogrammetrically aligned 3-dimensional model of said one or more teeth by aligning the cusp and valley surface features of the model to like features in the images of said one or more teeth, thereby producing an aligned dental model from the series of images.

17. (previously presented) The method as claimed in claim 16 wherein the rigid control target has a saddle form resting over said one or more teeth and the control features comprise vertices in the saddle form.